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(54) Title: PLANTS HAVING IMPROVED GROWTH CHARACTERISTICS AND A METHOD FOR MAKING THE SAME

(57) Abstract: The present invention concerns a method for improving plant growth characteristics by increasing expression in a plant of a nucleic acid encoding a CCS52 protein and/or by increasing level and/or activity in a plant of a CCS52 protein. The invention also relates to transgenic plants having improved growth characteristics, such as increased plant size, increased organ size or increased number of organs, which plants have increased expression of a nucleic acid encoding a CCS52 protein.

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C. DOCUME Category °	ENTS CONSIDERED TO BE RELEVANT  Citation of document, with indication, where appropriate, of the relevance.	ant passages	Relevant to claim No.			
Calogory		<u> </u>				
х	WO 99/64451 A (CEBOLLA ANGEL ; KONDOROSI EVA (FR); KONDOROSI ADAM (FR); CENTRE NAT)		1-21			
ļ	16 December 1999 (1999-12-16)					
	cited in the application	•				
	the whole document * in particular pages 9-11, figure 1B *					
,	CEBOLLA A ET AL: "The mitotic in		1-21			
X	ccs52 is required for endoredupl1Cat1On					
ļ	and ploidy-dependent cell enlargement in plants"					
	EMBO JOURNAL, OXFORD UNIVERSITY PRESS,					
ļ	SURREY, GB, vol. 18, no. 16, 1999, pages 4476-4484,					
].	XP002125116					
ł	ISSN: 0261-4189 cited in the application					
	the whole document					
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	ther documents are listed in the continuation of box C.	X Patent family member	s are listed in annex.			
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i citati	on or other special reason (as specimed)	cannot be considered to i	invoive an inventive step when the ith one or more other such docu-			
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	European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,	Bucka, A				
	Fax: (+31-70) 340-3016	bucka, A				

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PCT/IB2004/000970

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	ation) DOCUMENTS CONSIDERED TO BE RELEVANT  Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	
Category °	Citation of document, with indication, where appropriate, or the relevant passages		
Х	DATABASE EMBL 7 May 2002 (2002-05-07), NGUYEN M. ET AL.: "Arabidopsis thaliana putative fizzy-related protein (At4g22910) mRNA, complete cds." XP002250756 Database accession no. AY099585 the whole document	10-12,14	
X	DATABASE EMBL 3 July 1998 (1998-07-03), BEVAN M. ET AL.: "Arabidopsis thaliana DNA chromosome 4, BAC clone F7H19 (ESSA project)" XP002250757 Database accession no. AL031018 Positions: 25865 - 28572, note: strong similarity to fizzy-related protein	10-12,14	
X	DATABASE EMBL 9 December 2001 (2001-12-09), "Arabidopsis thaliana putative Srw1 protein (At4g11920) mRNA, complete cds." XP002250758 Database accession no. AY063875 the whole document	10-12,14	
Α	FAVERY BRUNO ET AL: "The endosymbiosis-induced genes ENOD40 and CCS52a are involved in endoparasitic-nematode interactions in Medicago truncatula." MOLECULAR PLANT-MICROBE INTERACTIONS, vol. 15, no. 10, October 2002 (2002-10), pages 1008-1013, XP008020613 ISSN: 0894-0282 the whole document	1-21	
A	FOUCHER FABRICE ET AL: "Cell cycle regulation in the course of nodule organogenesis in Medicago." PLANT MOLECULAR BIOLOGY, vol. 43, no. 5-6, August 2000 (2000-08), pages 773-786, XP002250666 ISSN: 0167-4412 page 781, right-hand column - page 782, right-hand column	1-21	
А	JOUBES J ET AL: "Endoreduplication in higher plants" PLANT MOLECULAR BIOLOGY, NIJHOFF PUBLISHERS, DORDRECHT, NL, vol. 43, no. 5-6, August 2000 (2000-08), pages 735-745, XP002240147 ISSN: 0167-4412 page 740, left-hand column	1-21	
	-/		

PCT/IB2004/000970

Category °	ation) DOCUMENTS CONSIDERED TO BE RELEVANT  Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 00/56905 A (VEYLDER LIEVEN DE ;INZE DIRK (BE); BURSSENS SYLVIA (BE); CROPDESIG) 28 September 2000 (2000-09-28) the whole document	1-21
<b>A</b>	LI Z ET AL: "Comparison of promoters and selectable marker genes for use in Indica rice transformation" MOLECULAR BREEDING: NEW STRATEGIES IN PLANT IMPROVEMENT, KLUWER ACADEMIC PUBLISHERS, NL, vol. 3, no. 1, 1997, pages 1-14, XP002162549 ISSN: 1380-3743 the whole document	1-21
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International Application No
PCT/IB2004/000970

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
WO 9964451	A	16-12-1999	FR AU CA EP WO JP	2779433 A1 4046599 A 2330244 A1 1086128 A2 9964451 A2 2002517221 T	10-12-1999 30-12-1999 16-12-1999 28-03-2001 16-12-1999 18-06-2002
WO 0056905	A	28-09-2000	AU CA WO EP	4396000 A 2367476 A1 0056905 A2 1163341 A2	09-10-2000 28-09-2000 28-09-2000 19-12-2001